

Space Shuttle Safety

Written Testimony of

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For the

Subcommittee on Science, Technology and Space

Committee on Commerce, Science, and Transportation

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Mr. Chairman and members of the subcommittee, thank you for inviting me here to testify. My name is Bryan D. O'Connor. I was Chairman of the National Research Council's Committee on Space Shuttle Upgrades in 1998/99, and I hold a regular position as Director, Engineering Division at Futron Corporation in Washington, DC. As you know, the National Research Council (NRC) is the operating arm of the National Academy of Sciences, National Academy of Engineering, and the Institute of Medicine, chartered by Congress in 1863 to advise the government on matters of science and technology.

In May 1998, the National Aeronautics and Space Administration (NASA) asked the NRC to examine the agency's plan for further upgrades to the space shuttle system. The NRC was asked to assess NASA's method for evaluating and selecting upgrades and to conduct a top-level technical assessment of proposed upgrades. The committee finished its work in late 1998, and published its report in early 1999. NASA responded to the report in March 1999. The full report is available to the public through the National Academy Press. Attached to my written statement is the report's executive summary as well as NASA's written response.

At the time of the committee's assessment, NASA was looking ahead to a decision by the end of the decade to either begin a phase out of the shuttle system, or to extend it's operations beyond 2012. With this major decision still ahead of them it was difficult for NASA to plan with confidence on major upgrades, so their main efforts were being spent on those near term improvements that would make sense no matter what the decision might be. Flight safety was, as usual, the highest priority, and our committee looked at the upgrade selection process with that in mind. With only a few minor exceptions, we found their process and decision support tools consistent with safety and the other NASA priorities of launch schedule dependability, supportability of the system's aging components, and operations efficiency. Although we made no specific recommendations as to implementation of the various upgrade options, we did offer 25 recommendations for improvements in the upgrade selection process, most of which were agreed to and enacted by NASA.

Since the committee's report was published, events have dictated that NASA look at shuttle for the long term while difficult technology and market issues are worked out for its eventual replacement. At the same time, fiscal challenges with NASA's human spaceflight programs require continued selectivity and prudence with shuttle upgrade choices. The latest risk assessments for the shuttle system show that changes since the Challenger accident have improved the risk posture of the vehicle by nearly an order of magnitude, but it still falls well short of the overall safety level NASA demands of future human rated vehicles. Considering the fundamental design and complexity of the shuttle, it is my own personal opinion that no amount money for upgrades will get it to the levels of reliability and operational cost that NASA has stated as its goals for the Space Launch Initiative (SLI). So, while the SLI works towards those worthy goals, NASA should continue looking with care at those affordable improvements that keep the shuttle flying safely in an environment of component obsolescence. Moreover, it is equally important that they continue to pay close attention to the people aspects of such a complex system. This unique human-crewed space launch vehicle with its high risk propulsion and hydraulic control systems and extremely limited escape system will always need substantial hands on care and preparation between flights. It requires nothing short of full attention - 100% of the time - by the best 20,000 people NASA and its contractors can field.

Attachments:

Executive Summary-Upgrading the Space Shuttle
NASA Response to the NRC Report on Space Shuttle Upgrades